Trend Study 16A-14-97

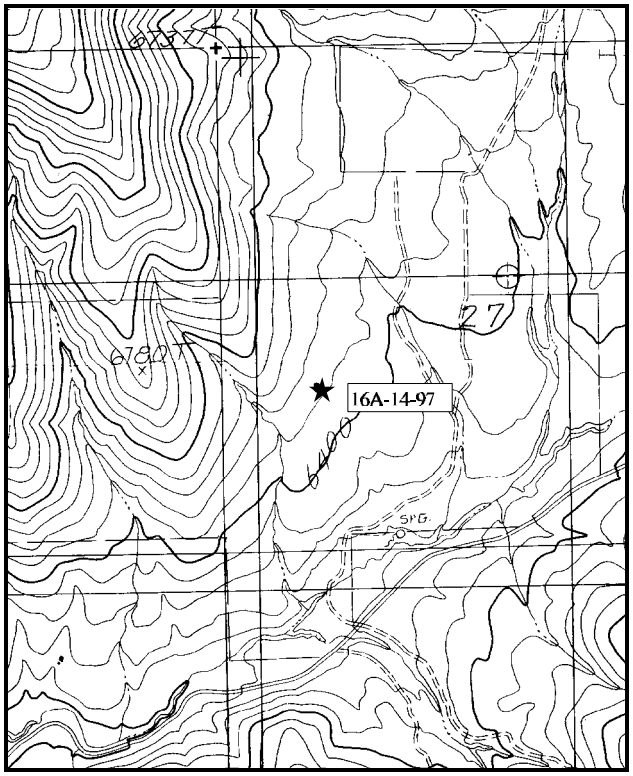
Study site name: Big Hollow . Range Type: Big sagebrush

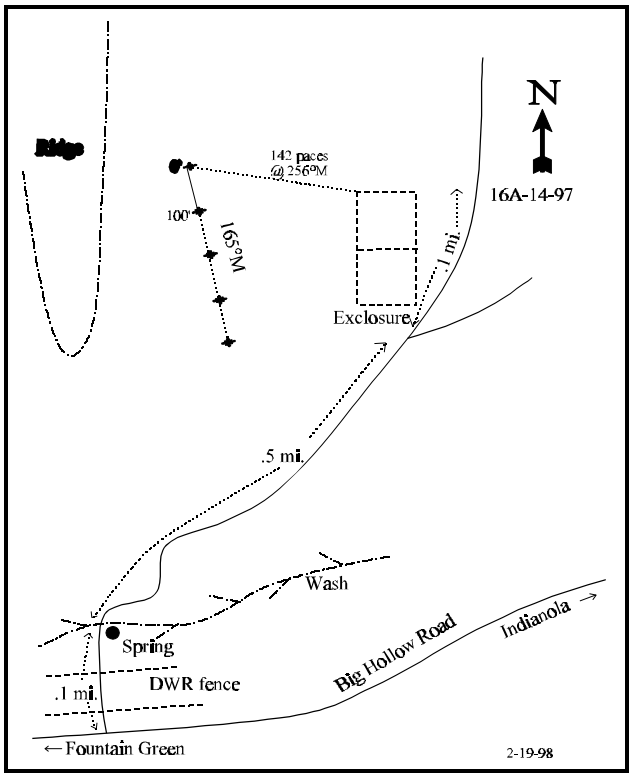
Compass bearing: frequency baseline 165 M degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

In Fountain green, at the intersection of State Street and 100 North, go east on 100 North for 0.3 miles to the old dump. Continue up Big Hollow for 3.3 miles to a gate parallel to the road onto DWR land. Turn left through the gates and go 0.1 miles to a spring in a wash. Continue on this road for 0.5 miles to a fork. Stay left and go 0.1 miles to the north end of an exclosure. Park here. From the north-west corner of the exclosure walk 142 paces at a bearing of 256 degrees M to a tall fencepost in the sagebrush. This 4-foot tall green fencepost is the 0-foot baseline stake.





Map Name: Big Hollow . Diagrammatic Sketch

Township 13S , Range 3E , Section 27 UTM 4389654.916 N, 450200.302 E

DISCUSSION

Trend Study No. 16A-14 (25-14)

The Big Hollow study is located on Division property east of Fountain Green on a large area that was chained in 1964. However, there is little evidence of the treatment on the site which is located near the bottom of a ridge. Trees appear to have never been very dense on the site, and no seeded species were present. Other areas of the chaining were apparently more heavily seeded. There are only a few scattered junipers on the site, averaging 6-10 feet in height. The dominant vegetation is basin big sagebrush with a smaller element of bitterbrush. There is a perennial spring 200 yards southeast of the study. Due to the availability of water during the dry year of 1989, deer were using the area during the summer. However, the majority of big game use occurs in winter and spring. One recent winter-killed fawn was found on the site in 1989. In 1997, rabbit pellet groups were relatively abundant with a quadrat frequency of 26%. A pellet group transect of 50, 100ft^2 circular plots (this should not be confused with the pellet-group quadrat frequencies) was read in 1997 and estimated 31 deer days use/acre, 2 elk days use/acre, and 6 cattle days use/acre.

The soil is a moderately deep, sandy clay loam with an effective rooting depth (see methods) of almost 12 inches. It contains a substantial amount of small rocks that are concentrated as erosion pavement on the soil surface. Rock and pavement cover together had a cover value of 30% in 1989 and 23% in 1997. Rock is concentrated in the upper 8 inches of the soil profile. As a result, soil temperature was relatively high, averaging 63^{0}F at an average depth of 13 inches. Litter is moderately low due to the sparse herbaceous understory. Percent bare ground was 17% in 1989, but has since declined to 11%. Considering the amount of rock, pavement, and exposed soil, there is little erosion because of the level topography.

As winter range, browse is the key forage component. Basin big sagebrush *(Artemisia tridentata tridentata*) currently makes up 63% of the browse cover on the site. It is characteristically tall and vigorous on this site with light utilization. Population density was originally estimated at 2,599 plants/acre in 1989. Recruitment was adequate, vigor good, but percent decadency was moderately high at 33%. Data from 1997 show a 32% decline in density to 1,780 plants/acre. The number of mature plants remains similar with the density of young and decadent plants decreasing. Some of the difference between years may be due to the much larger sample used in 1997, but 42% of the difference can be explained by the number of dead plants on the site (340 plants/acre).

Bitterbrush numbered only 599 plants/acre in 1989. Vigor was good on the moderate to heavily hedged plants. They have relatively open crowns, average growth and seed production. The taller shrubs exhibit good leader growth when the branches are out of reach from browsing. During the 1997 reading, density of bitterbrush was estimated at only 280 plants/acre. Since no dead plants were encountered, this density is considered a more accurate population estimate due to the larger sample size used in 1997 which gives better estimates for populations that are clumped and discontinuous in their distribution. Bitterbrush in 1997 was classified as moderately to heavily hedged. Percent decadency is relatively low at 21%, but all decadent plants sampled displayed poor vigor and appeared to be dying. Young plants account for 29% of the population and are abundant enough to replace decadent individuals.

Broom snakeweed, an undesirable invader/increaser, has increased by 96% since 1989 from a density of only 799 plants/acre to 22,560. Strip frequency (see methods) indicates that it is widely distributed throughout the site with a frequency of 79%. The age distribution of the population would also indicate that it shows characteristics of an expanding population.

The understory is comprised of a sparse stand of native grasses and a few forbs. Cheatgrass alone makes up

41% of the grass cover. The nearby exclosure supports a much higher abundance of seeded grasses. No seeded grasses were found on the immediate area of the sampled site.

1989 APPARENT TREND ASSESSMENT

The Big Hollow area provides quality big game winter range. There is an abundance of browse forage. The site sampled is less productive in terms of herbaceous vegetation for spring use, but other parts of the treated area have robust stands of seeded grasses. Trends for deer winter range values are stable.

1997 TREND ASSESSMENT

Trend for soil is up slightly due to a decline in percent bare soil and an increase in nested frequency of perennial grasses. Browse trend for the preferred species, basin big sagebrush and bitterbrush appear stable, however, the large increase in broom snakeweed from 799 plants/acre to 22,560 plants/acre indicates a deteriorating trend. The herbaceous understory is sparse, but sum of nested frequency of perennial grasses and forbs increased slightly. The nearby exclosure supports a good stand of seeded and native grasses, illustrating the obviously heavy livestock use of the herbaceous vegetation outside of the fence.

TREND ASSESSMENT
soil - up slightly
browse - down due to alarming, almost exponential increase of broom snakeweed
herbaceous understory - up slightly for the perennial species

HERBACEOUS TRENDS --
Herd unit 16A , Study no: 14

Type	Species	Nested Frequency '89	Nested Frequency '97	Quadrat Frequency '89	Quadrat Frequency '97	Average Cover % '97
G	Agropyron spicatum	11	39	5	18	.70
G	Bromus tectorum (a)	-	238	-	84	3.74
G	Carex spp.	-	*41	-	16	.74
G	Oryzopsis hymenoides	74	67	29	29	1.85
G	Poa secunda	-	3	-	1	.00
G	Sitanion hystrix	89	*40	41	18	.86
G	Stipa comata	12	*46	6	19	1.05
Total for Grasses		186	474	81	185	8.96
F	Alyssum alyssoides (a)	-	148	-	58	1.02
F	Astragalus lentiginosus	1	-	1	-	-
F	Calochortus nuttallii	-	2	-	2	.01
F	Chaenactis douglasii	12	*21	5	11	.11
F	Chenopodium spp.	-	2	-	1	.00
F	Cirsium spp.	8	17	4	8	.04

Type	Species	Nested Frequency '89	'97	Quadrat Frequency '89	'97	Average Cover % '97
F	Eriogonum spp.	1	2	1	1	.00
F	Gilia spp. (a)	-	1	-	1	.00
F	Hackelia patens	-	4	-	1	.03
F	Lactuca serriola	-	1	-	1	.00
F	Orobanche fasciculata	-	1	-	1	.00
F	Polygonum douglasii (a)	-	15	-	6	.05
F	Sphaeralcea coccinea	42	35	14	18	.47
F	Tragopogon dubius	8	3	4	1	.01
Total for Forbs		72	252	29	110	1.78

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 16A , Study no: 14

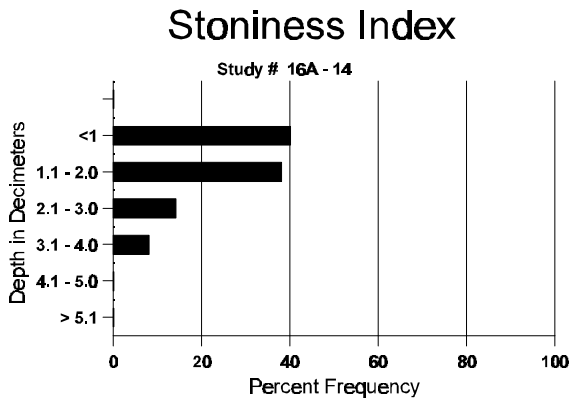
Type	Species	Strip Frequency '97	Average Cover % '97
B	Artemisia tridentata tridentata	61	14.77
B	Artemisia tridentata vaseyana	1	.30
B	Gutierrezia sarothrae	79	5.73
B	Juniperus osteosperma	0	.00
B	Opuntia spp.	5	.18
B	Purshia tridentata	12	2.27
Total for Browse		158	23.27

BASIC COVER --
Herd unit 16A , Study no: 14

Cover Type	Nested Frequency '97	Average Cover % '89	'97
Vegetation	333	3.25	33.79
Rock	180	3.75	5.09
Pavement	292	26.25	17.61
Litter	384	49.00	44.18
Cryptogams	74	.50	1.59
Bare Ground	246	17.25	11.16

SOIL ANALYSIS DATA --
Herd Unit 16A, Study no: 14

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
11.7	63.4 (13.2)	6.8	48.0	27.1	24.9	2.9	13.3	166.4	.5



PELLET GROUP FREQUENCY --
Herd unit 16A , Study no: 14

Type	Quadrat Frequency '97
Rabbit	26
Elk	2
Deer	32
Cattle	1

BROWSE CHARACTERISTICS --
Herd unit 16A , Study no: 14

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata tridentata																		
S	89	2	-	-	1	-	-	-	-	-	3	-	-	-	200			3
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	89	4	-	-	1	-	-	-	-	-	5	-	-	-	333			5
	97	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	89	15	6	-	-	-	-	-	-	-	19	2	-	-	1400	31	33	21
	97	54	1	-	1	-	-	-	-	-	56	-	-	-	1120	36	48	56
D	89	11	1	-	1	-	-	-	-	-	12	-	-	1	866			13
	97	21	2	-	1	-	-	-	-	-	16	-	-	8	480			24
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	340			17

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	18%	00%	03%	-32%
'97	03%	00%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	2599	Dec:		33%
'97	1780			27%

Artemisia tridentata vaseyana																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	Appeared
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	0	Dec:	-
'97	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	327	5	-	2	-	-	-	-	-	334	-	-	-	6680			334
M	89	11	-	-	-	-	-	-	-	-	11	-	-	-	733	6	4	11
	97	758	-	-	35	-	-	-	-	-	793	-	-	-	15860	10	11	793
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+96%
'97	.44%	00%	.08%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	799	Dec:		0%
'97	22560			0%

Opuntia spp.																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	7	-	-	-	-	-	-	-	-	7	-	-	-	140	5	9	7
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	Appeared
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	0	Dec:		-
'97	160			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
Y	89	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	97	1	-	1	2	-	-	-	-	-	4	-	-	-	80			4
M	89	-	4	-	-	-	-	-	-	-	4	-	-	-	266	24	38	4
	97	-	4	1	1	1	-	-	-	-	7	-	-	-	140	57	69	7
D	89	1	1	1	-	-	-	-	-	-	3	-	-	-	200			3
	97	1	-	1	-	-	1	-	-	-	-	-	-	3	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	67%	11%	00%	
'97	36%	29%	21%	-53%

Total Plants/Acre (excluding Dead & Seedlings)				
'89	599	Dec:	33%	
'97	280		21%	